

ABSTRACT

**GAS-PHASE PROCESS FOR PURIFYING SINGLE-WALL CARBON
NANOTUBES AND COMPOSITIONS THEREOF**

5

The present invention relates to an all gas-phase process for the purification of single-wall carbon nanotubes and the purified single-wall carbon nanotube material. Known methods of single-wall carbon nanotube production result in a single-wall carbon nanotube product that contains single-wall carbon nanotubes in addition to impurities including residual metal catalyst particles and amounts of small amorphous carbon sheets that surround the catalyst particles and appear on the sides of the single-wall carbon nanotubes and “ropes” of single-wall carbon nanotubes. The purification process removes the extraneous carbon as well as metal-containing residual catalyst particles. The process comprises oxidation of the single-wall carbon nanotube material, reduction and reaction of a halogen-containing gas with the metal-containing species. The oxidation step may be done dry or in the presence of water vapor. The present invention provides a scalable means for producing high-purity single-wall carbon nanotube material.